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ABSTRACT

Pioneering Partners for Educational Technology was created to enhance learning in kindergarten through grade 12 by accelerating the use of educational technology. The program spotlights 24 project teams from Great Lakes states that are already using technology in creative ways in the following states: (1) Illinois; (2) Indiana; (3) Michigan; (4) Minnesota; (5) New York; (6) Ohio; (7) Pennsylvania; and (8) Wisconsin. Winning teams receive recognition, training, and coalition building assistance and see their project ideas disseminated. As a result, students across the area benefit. Narratives of the 24 programs that received Pioneering Partnership awards in 1992 are presented. They include in-school and extracurricular activities in basic skills and interdisciplinary approaches for elementary schools and secondary schools. (SLD)

Programs of 1992 Winning Teams

Sponsored by the Council of Great Lakes Governors

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Program Overview

Pioneering Partners for Educational Technology was created to enhance learning in K-12 classrooms by accelerating the use of educational technology.

The program spotlights 24 Project Teams from Great Lakes States that are already using technology in creative ways in their classrooms. These states include: Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin.

Winning teams receive:

- Recognition
- Training
- Coalition Building
- Dissemination

As a result, students across the Great Lakes region will benefit as these educators disseminate their programs, and as other teachers replicate those programs in their own classrooms.

Pioneering Partners for Educational Technology was implemented in 1992 by the Council of Great Lakes Governors and is supported by GTE North Incorporated.

About This Booklet

The descriptions on the following pages are narratives of the 24 programs that received Pioneering Partners awards in 1992.

We have also provided the names of the team members and a telephone number so you can contact each team for further information.

For further details on the Pioneering Partners program or if you are interested in applying for a Pioneering Partners grant, contact:

Pioneering Partners
Mail Code INAAAJZ
19845 US 31 North
Westfield, IN 46074

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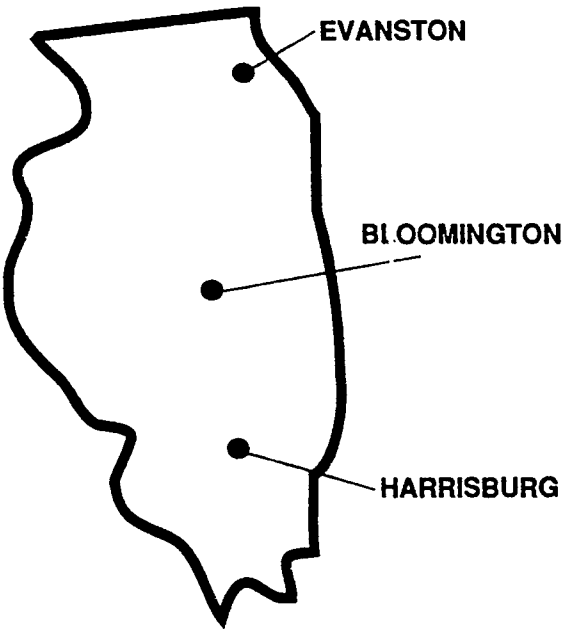
Illinois



CHILDREN'S TECHONOLOGY CENTER

Team Members... Clara Pate, Principal - work phone: (708) 492-7981; Marilyn Upchurch, Teacher; Frada Boxer, Computer Lab Manager; Rose Johnson, Member-Board of Education.

District(s)... Evanston-Skokie School District 65

Superintendent... Joseph Pollack

Schools Involved... Oakton Elementary School

Location... Evanston, Illinois

Twice a month, more than 100 students from across Evanston catch the high tech spirit at Oakton Elementary School. Through a series of Saturday morning enrichment programs, students in grades K-3 get a taste of the types of experimental learning activities that are an integral part of the daily curriculum at Oakton.

As a designated school in the Math/Science Corridor program, Oakton Elementary is equipped with a computerized math lab geared toward individualized instruction and a hands-on science laboratory that encourages exploration and investigation. When planning the Saturday workshops, teachers and resource staff take advantage of these special resources available at Oakton Elementary.

At one session called "Patterns, Patterns Everywhere," students learned about geometric shapes and patterns in nature, architecture and the everyday world. During "Kitchen Chemistry" students learned how to measure and create mysterious liquids. Students constructed kaleidoscopes, pin hole cameras and periscopes at the "Light Fantastic" program.

Throughout the year students could work with "Hello," a computer pen pal system from National Geographic Society. Using this program, students could communicate via a telecommunications system with other children around the world.

Oakton's Children's Technology Center has become a focal point of community activity. As volunteers assisting teachers, parents make formal presentations during workshops. Teachers from other district schools intrigued by the concept of the Center have participated in various programs. Perhaps, the most important indication of success is student participation. Even though these activities are part of their regular school activities, many Oakton students flock to the Saturday morning programs.

Parents and teachers often are asked to attend meetings after school in the evening. At Bloomington High School, some evening open houses mean more than boring talk and shuffled papers; teachers, parents

MINIATURE GOLF GOES HIGH TECH

Team Members... Nancy Powell, Lead Teacher - work phone: (309) 828-5201; Steve Graham, Director-Vocational Center; Mark Anderson, Drafting/CADD Instructor, Stanley Winterroth, Teacher.

District(s)... Bloomington School District 87

Superintendent... Dr. Leonard Roberts

Schools Involved... Bloomington High School

Location... Bloomington, Illinois

and siblings tee off for cut-throat games of miniature golf.

Transformational geometry students and industrial tech students, using skills developed in their separate coursework, teamed up to build life-size miniature golf holes. The math students acted as engineers, designing the holes based on geometric principles. The industrial tech students, in cooperative teams with the geometry students, actually manufactured the golf holes, cutting the wood and constructing bridges, ramps, obstacles, and sand and water hazards.

The teams tapped resources throughout the school to enhance their projects. Teams learned how to use CAD (Computer Aided Design) software from the drafting class to improve their designs. One group had a quick lesson in sheet metal bending and soldering to build a water hazard. The vocational printing class helped another group present a slick poster. Many students consulted the art teacher on tools and materials.

Students also created community interest in the project. Although each team had a construction budget, donations didn't count against their allocations. Consequently, students developed ingenious sales pitches for their projects and learned how to approach area businesses for support.

At the completion of the project, students were required to donate their golf holes to another school. The students made all the arrangements, contacting principals at elementary and junior high schools to explain the project and inquire if the school could use the hole. In addition to donating the project, the students often were invited into the classrooms to teach both teachers and students how to use the holes. Not only were the students demonstrating the geometry they had learned, they had to work on their presentation skills.

Students learned more than geometry from the golf project. The industrial tech students realized that geometry wasn't limited to an academic environment; they actually used geometry on a daily basis in their activities. The geometry students learned that the theory they were learning could be applied to real situations.

By working on teams with teenagers they normally wouldn't meet in class, college-bound and vo-tech students gained new respect for the talents and skills of others. Enthusiasm for team projects is spreading throughout the school. With students, teachers and parents jostling for a chance to sink a hole-in-one, open houses at Bloomington High have become a showcase for technology and talent as well as an 8-foot putt.

COMPUTER AND VIDEO TO ENHANCE STUDENT LEARNING

Team Members... Cindy Black, Media Specialist - work phone: (618) 252-8673; Paula Segraves, Teacher; Jack Simmons, Regional/Inservice Director; Jane Simmons, Teacher.

District(s)... Harrisburg Community School District 3

Superintendent... Donald Albracht

Schools Involved... East Side Elementary School

Location... Harrisburg, Illinois

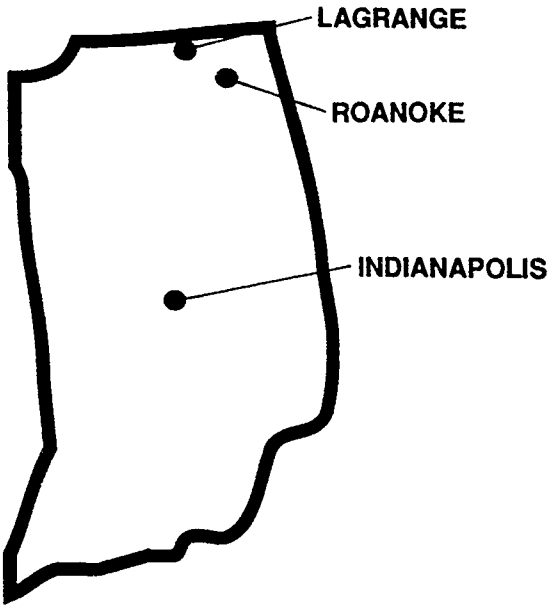
Ask the children what they dislike most about school and many will reply, "Getting up early." But fourth graders at East Side Elementary bound out of bed and report to school earlier than their sleepyhead schoolmates. Like their counterparts at television network morning news programs, these budding researchers, reporters and producers start early to get a jump on the news for their viewers.

The daily student newscast is a blend of national and international news, sports, weather, entertainment and consumer pieces. Most of the raw material for the news reports is gathered via modem from a local cable company. Student weather reporters use a computer program supplied by station WPSD in Paducah, Kentucky. Other East Side students submit art work and letters to the editor to be included in the newscast.

After they've researched the day's stories, the students compose their scripts on the computer. While reporters conquer stage fright and learn the fine points of performing before the camera, producers operate the video equipment, recording the "live" newscast for broadcast later.

The student production airs daily throughout the school. In addition, twice a week parents and friends can watch the newscast on a local cable channel dedicated to school information and programming produced by schools throughout the district. The fun of producing the show and the fame of television celebrity make the extra work worthwhile to these fourth graders.

Indiana



IMPROVING COMMUNICATION SKILLS WITH VIDEO CAMERAS

Team Members... Marianna Muntz, Library Media Specialist - work phone: (219) 463-7447; Thomas Smith, Principal; Barbara Frymier, Teacher; Susan Schlemmer, Supervisor-Soil & Water, LaGrange County.

District(s)... Lakeland School Corp.

Superintendent... William Walz

Schools Involved... Lakeland Junior High School

Location... LaGrange, Indiana

Television has been blamed for most of our educational system's woes from declining standardized test scores to a decrease in literacy. Yet, teachers at Lakeland Junior High School turned that criticism around and used video technology to improve their students' communications skills.

After learning the basic skills needed to operate a video camera, students were encouraged to produce tapes focusing on the abundant natural resources in their community. With cameras in hand, they surveyed county parks, explored wetland areas and interviewed a park naturalist. One student production, "LaGrange County Parks," received awards at both the district and state level media fairs sponsored by the Association of Indiana Media Educators.

In subtle ways, students discovered that even video productions require a variety of communications skills. Project planning often began by researching the topic. Scripts had to be written and well organized. Productions included titles created on a computer. The tapes were edited for both visual and literary content.

By working in groups, the students started developing the team skills needed in today's business environment. The hands-on nature of the projects allowed students to set their own objectives. Through active participation, each student learned the roles needed to interact effectively with the group. And students assumed their individual roles without advanced priming from the teacher.

These student producers became active rather than passive members of the television generation. The students soon realized they needed skills learned in English, science, computer science, art and social studies classes to effectively communicate with their peers.

BUDDY PROJECT

Team Members... Steven Cobb, Principal - work phone: (219) 434-2470; Cynthia Brown, Teacher; David Johns, School Board President; Steve Riethmiller, Computer Coordinator.

District(s)...M.S.D. Southwest Allen

Superintendent... Dave Hales

Schools Involved... Lafayette Central Elementary School

Location... Roanoke, Indiana

With the American educational system under critical assault, educators look to increased parental involvement in school activities and increased emphasis on academics in the home as key factors in improving student performance. Lafayette Central's participation in the Buddy Project has generated tremendous parental support, increased contact between parents and teachers and encouraged a family orientation toward school projects.

The Buddy Project places computers in students' homes as well as in the classroom. Through telecommunications links, students can contact other Buddy students across the state as well as "talk" with their teachers. The home computers allow students and their families to explore on-line resources including encyclopedias, news, weather, sports and finance services.

Parents actively support the project through the Buddy Parent Club. The club's newsletters, electronic messages and training workshops encourage parents to learn more about technology and to work closely with their children on a variety of activities. Team members often share insights into new technology at special sessions designed for families as well as with students in the classroom setting. The club publicizes family activities available through the statewide Buddy network and promotes contact with school personnel through on-line school chat sessions.

Not only have parents learned more about computers, they have become vocal advocates for the use of technology in the classroom. Parents strongly supported new projects broadening community involvement including telecommunications links between students and residents of a local nursing home. Some parents have encouraged their employers to communicate via computer with the students. And parents are reaching beyond the school environment by participating in meetings with school, community and business leaders exploring new technology partnerships.

LAB APPROACH TO TEACHING PHONICS AND WRITING SKILLS

Team Members... Lynn Noel, Teacher - work phone: (317) 226-4253; David Spencer, Assistant Principal; Sharon Keim, Teacher; Dr. Matthew Maurer, Professor of Instructional Technology.

District(s)... Indianapolis Public Schools

Superintendent... Shirl Gilbert II

Schools Involved... William McKinley School #39

Location... Indianapolis, Indiana

During the primary grades, students must acquire basic skills that form the foundation of all future learning. Realizing their first grade students' failure rate was much too high, teachers at William McKinley Elementary School developed a pilot program using technology to help students improve their basic reading skills.

Once the faculty determined students needed more intensive phonetic training, a lab was set up to reinforce phonics skills learned in the classroom as well as introduce new concepts that could be expanded in the classroom. Using existing software, the program was customized to coordinate with the school system's first grade curriculum.

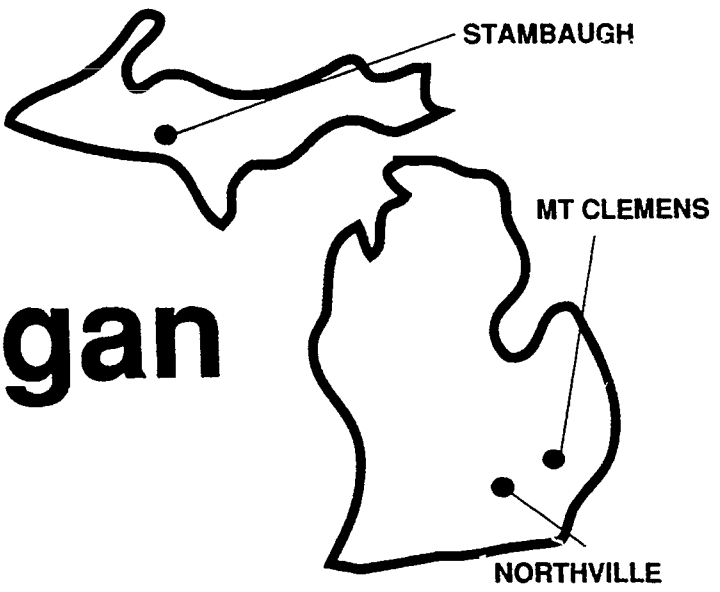
The lab is organized into five learning areas -- sound, writing, activity, skill and listening stations. Since students learn in a variety of styles, the lab has a multi-sensory approach using a variety of visual, auditory and tactile activities. Three of the stations are computer-oriented, one is a listening activity, and the other requires students to manipulate objects or complete worksheets.

Each day students go to the lab with their classroom teacher for 30 minutes and participate in one learning area. At the end of each week, the lab teacher provides the classroom teacher a report of each student's progress at each station. The classroom teacher can then follow through with additional work on classroom computers or with paper and pencil activities.

Students enjoy their time in the lab and teachers see their students' skills improve. Penmanship, basal reading and creative writing have all improved with the lab program. Not only has the lab approach helped to significantly improve student skills, it has provided a consistent and unbiased approach, exposing all students to the same system of learning.

Because of the success of the first grade program, the lab approach has been extended to other primary grade levels. The same format of learning stations is used with varying emphasis on creative writing and phonetic language skills.

Throughout the formation of the pilot program, William McKinley teachers consulted with faculty at Butler University about the impact of technology on both students and teachers. Now the elementary school staff is returning the favor by becoming a resource for the university. The elementary teacher team will help train university students using the lab programs in place.



Michigan

COMPUTERS ARE TOOLS

Team Members... Sharon Stockero, Superintendent - work phone: (906) 265-6101; Sharon Holmes, Teacher; Sandi Barry-Scalcucci, Teacher.

District(s)... West Iron County Public Schools

Superintendent... Sharon Stockero

Schools Involved... Stambaugh Elementary/Middle School

Location... Stambaugh, Michigan

While pundits and politicians stress the need for technology in the classroom, they often overlook an important step in achieving that goal: the classroom teacher. Teachers will not promote the use of computers and other forms of technology in the classroom unless they feel comfortable and competent in both the use of the technology and the selection of appropriate applications.

Just as students thrive in a mentoring situation, so do teachers. A trained resource teacher on staff at Stambaugh Elementary/Middle School provides a mentor/model for other teachers as they become familiar with the computer's potential in the classroom.

The mentor model teacher provides three group in-service training sessions. While actually working on computers, teachers-in-training consider computer use in the classroom setting and in a learning center or lab environment. The hands-on setting allows teachers to evaluate software as they use it, design classroom management systems for individual applications, and decide if a particular program meets instructional objectives.

While many school districts use this type of hands-on training program, the Stambaugh program adds a unique feature -- individual one-on-one training sessions in the teacher's own classrooom. The mentor model teacher actually demonstrates the technology and the application of the software programs in the classroom. The modeling session is conducted after each group training session. This additional step is critical to maintaining the teacher-in-training's enthusiasm.

The mentor model teacher is shadowed throughout the training by a member of the school staff; thus the project leaves in place an in-house model teacher. His/her proximity to teachers-in-training provides very real human support. Too often rural teachers feel isolated without a continuing system of support. On a daily basis, the Computers are Tools program helps teachers to maintain their enthusiasm and transmit their newly-learned skills to their students.

K-12 TECHNOLOGY OUTCOMES

Team Members... Barbara Fife, Teacher - work phone: (313) 344-8111; William Hamilton, Director of Instructional Services; Stephen Sutherland, Teacher; Gary Gandolfi, Teacher.

District(s)... Northville Public Schools

Superintendent... Leonard Rezmierski

Schools Involved... Amerman Elementary School, Moraine Elementary School, Silver Springs Elementary, Winchester Elementary, Cooke Middle School, Meads Mill Middle School, Northville High School.

Location... Northville, Michigan

The Northville Public Schools have taken the high tech plunge. The entire school district is linked through a fiber-optic network that ties together 24 fileservers, central machines containing computer software for all users. Every classroom also is connected by two-way interactive video/audio communications. More than 700 computers are networked in labs and classrooms district-wide.

Once the hardware was installed, teachers needed to know how to use the technology for classroom instruction. The district's instructional technology committee developed an outline for integrating technology across the K-12 curriculum.

Students at each grade level are expected to develop certain technology skills. As they progress, they must use more sophisticated combinations of those skills to produce assigned projects. Students become familiar with a variety of software options and then must choose the appropriate combinations to complete an assignment.

Student progress in mastering technology skills is maintained in a district-wide database. Students have the option of including examples of technology achievements in their portfolios. In the future, student writing and multimedia projects will become part of larger electronic portfolios.

An orderly process for acquiring specific technology skills at each grade level is preparing the Northville Public Schools' students for the 21st century. Once students learn how to use current technology, they will be better prepared to transfer their knowledge and skills to emerging technologies.

COMPUTER GRAPHICS IN ART

Team Members... James Wenzloff, Educational Tech. Coordinator - work phone: (313) 228-5518 ext. 240; Suzanne Bright, Art Dept. Chair/Teacher.

District(s)... Mount Clemens Community Schools

Superintendent... Dr. Blanche Fraser

Schools Involved... Mount Clemens High School

Location... Mt. Clemens, Michigan

Today's teenagers expect to see impressive special effects and computer generated graphics in movies and commercials. However, few really understand how these effects are produced. Students at Mount Clemens High School have an opportunity not only to learn how computers influence the commercial artist, but to express themselves using many of the tools available to professionals.

Students learn to use design programs, paint programs, digitizing equipment, laser discs, desktop publishing and print shop techniques in advertising design, fine arts and design production classes. In one final project for an advertising design class, students used these techniques to develop a four part advertising campaign for a product of their own creation. They produced a color magazine ad, a short animated television commercial and a black and white newspaper ad to promote their products.

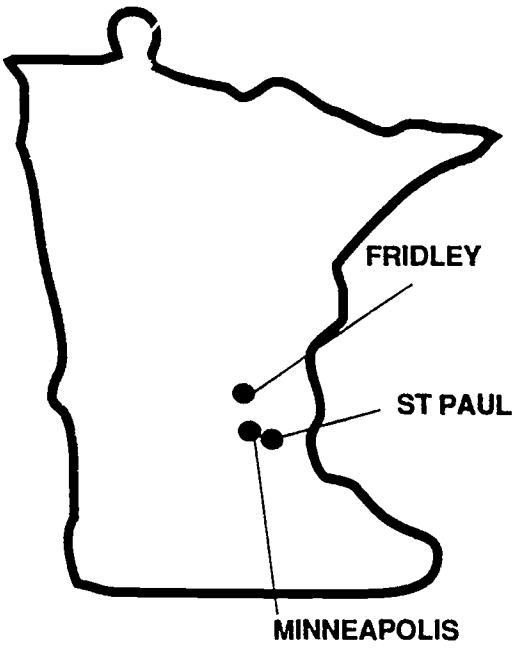
In a fine arts class, students drew eight-color still life pictures/images on the computer as a final project. This project helped students realize that the computer can be used as an artistic tool just as they would use a paintbrugh or pastels.

Mount Clemens art students develop skills in using computer software to create designs and art work similar to those produced by commercial artists in the work place. As part of their course work, students are required to create animations with sound, design a business logo, use digitized images to create an advertisement, and prepare a restaurant menu. Not all student projects are theoretical: the Chamber of Commerce and several area businesses have asked students to design logos, posters and tickets for business functions.

Computer technology has proven to be a wonderful tool for enhancing creativity, not only at the high school level, but at the elementary level as well. Computer graphics are used in the entire K-12 art program. In addition, elementary level students are using computer graphics to illustrate stories they write.

Graphics programs bypass the limitations of using paper and pencil, eliminating much of the tedious manual work involved in making changes. The accessibility of the technology encourages students who don't view themselves as artists to express themselves in artistic forms.

Minnesota



WRITING ACROSS THE CURRICULUM

Team Members... Richard Paul, Assistant Principal - work phone: (612) 571-9116; Dennis Cooney, Computer Specialist/Teacher; Mary Ellen Briel, Teacher; Margaret Anderson, Teacher.

Superintendent... Brother Milton Barker FSC

Schools Involved... Totino-Grace High School

Location... Fridley, Minnesota

English teachers and journalists are not the only people who need to write concisely and correctly. The ability to communicate effectively in writing is a critical skill for success in business, science and a variety of fields. Teachers and administrators at Totino-Grace High School realized students needed to improve their writing skills in all coursework, not just in English class.

After an intensive series of workshops with faculty from the University of Minnesota's Department of Rhetoric, the Totino-Grace team developed a writing/ mentoring project with the University. Totino-Grace students send drafts of writing projects via telecommunications technology to graduate students. The University students critique the writing, indicating methods of improvement, and send the information back to the high school students.

Technology to provide live video and voice transmission as well as shared data is being added on an experimental basis to this project. Student and mentors will see each other on monitors, share a common text on the monitor, and talk about improving the writing transmitted by the high school student.

Teachers hope to compare the effectiveness of the two methods of communication between student and mentor, telecommunications only and real time voice-video-data. This comparison may give educators some insight into the factors that most enhance student writing.

Both students and teachers agree students are more focused and enthusiastic when writing on computers than in a conventional pen and paper writing class. In addition, the physical arrangement of computers into pods permits students to share comments and to analyze each other's writing.

Teachers also have benefitted. They find themselves much more comfortable working in the computer lab setting. Colleagues are eager to share ideas, techniques and discoveries, conversations that classroom isolation often makes difficult. And they are structuring more collaborative learning activities into their curriculum.

CHEMISTRY, BIOLOGY AND ECOLOGY EDUCATION FOR THE 21ST CENTURY

Team Members... Lois Fruen, Academic Dean/Science Department Head/Teacher - work phone: (612) 347-9250; Joseph Breunig, Instructor; Sharyn Fenwick, Teacher.

Superintendent... Samuel Salas

Schools Involved... Breck School

Location... Minneapolis, Minnesota

How can our schools produce more scientists? The American educational system is faced with an enormous challenge: while our society's need for scientific and technical workers will increase dramatically in the 21st century, fewer students today are pursuing careers in science. By using the latest computer technology in their curriculum, teachers at the Breck School believe students have a greater degree of success in mastering scientific material. The technology allows students to share exciting discoveries with their peers and enjoy a more student-centered method of learning.

Computer programs are used to make animations of each stage of complex biological and chemical processes. As the students diagram each part of the process and tie the states together, abstract ideas like protein synthesis and DNA replication become distinctive visual concepts rather than dry facts quickly forgotten after the final exam.

In addition, students analyze results from ecology research projects and share their findings by computer. Presentations are limited only by the students' imagination. Using HyperCard programs and laser disk technology, students try to entertain as well as teach their classmates. Since each student can approach the material through a unique sequence, HyperCard projects transmit the excitement of discovery so often missing from science education.

Computer technology has expanded into science education at the lower school as well. After doing field research, elementary level students use HyperCard programs to organize and summarize findings. The resulting projects are shared with classmates. A new partnership with Pillsbury Math Science Technology School, an inner city elementary school, will allow students to share projects between schools as well as between grade levels.

While computer technology has improved student performance, it has had an even more profound effect on the student-teacher relationship. Teachers no longer are viewed as the primary source of information; instead, students and teachers work together as a team. Not only are students accepting more responsibility for their work, they feel more in control and able to master difficult information.

And the more success students have with particular subject matter, the more motivated they are to pursue careers in that field. Students who know how to use technology to study science may be the future scientists of the 21st century.

EIGHT AREAS OF TECHNOLOGY

Team Members... Lyle Odland, Principal - work phone: (612) 293-8830; Vaughn Nagahashi, Teacher; Suzanne Harriman, Teacher; John Gregersen, Teacher.

District(s)... Independent School District #625

Superintendent... Curman Gaines

Schools Involved... Washington Junior High Tech

Location... St. Paul, Minnesota

Although the school is billed as a technology magnet school, the faculty and staff at Washington Junior High view technology as a tool rather than a subject. Technology and equipment are used to support curriculum and give teachers a wide range of activities to enhance their subject matter.

At the CCC Computer Lab, students work on individual skills at their own pace. This lab is especially helpful to students learning English as a second language. The Discourse Lab encourages students who rarely volunteer in class to participate. Teachers and students communicate electronically and all students respond to a teacher's question or comment.

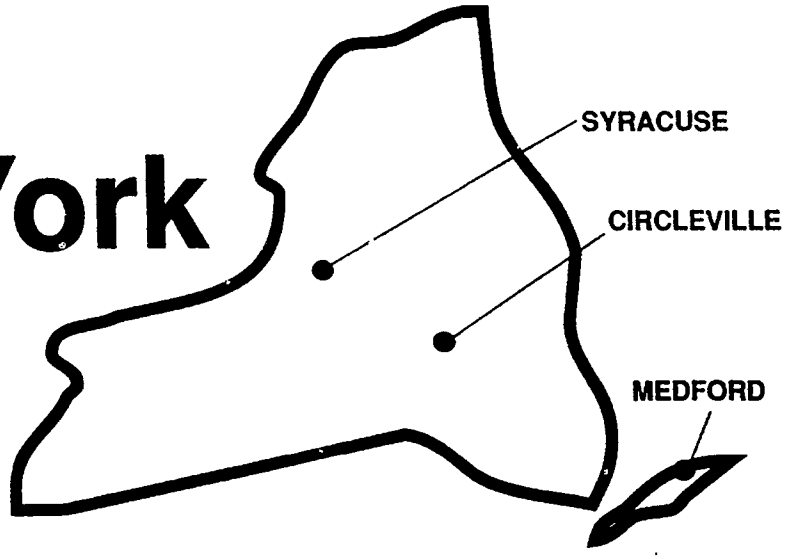
The fine arts program has been greatly enhanced by technology in the school. The Music Technology Lab supplements the traditional band/choir program. Students can use computers in conjunction with electronic music keyboards as well as digital horns and sequencers to explore production, composition, music theory and music appreciation.

While students experiment in a variety of art media, they also learn about electronic art and design programs. The Art/CAD Lab allows students to work on Macintosh computers to design art projects that can be printed on color printers, laserwriters and plotters. Students who work with the lab's CAD/CAM program will learn how products are designed and manufactured with computers.

A group of 25 students is using the Creative Writing/Video Production lab to create and produce an educational video on sexual harassment to be used throughout the school district. The lab's state-of-the-art video equipment allows students to experiment with a variety of special effects and character generation for titles and other text for video.

Finally, soon the entire library will be operating on computers and will offer research facilities using CD Rom technology. Students will be able to read and print articles from more than 80 newspapers and 100 magazines. By using CD Rom technology, students also will have access to research sources on video disk.

New York



TECHNOLOGY RICH/STUDENT-CENTERED

Team Members... Dr. Dorothy Klein, Assistant Superintendent - work phone: (516) 758-1019; Elizabeth Combs, Coordinator - Admin. & Instructional Technology; Anne Fichtner, Teacher; Pamela Wright, Member - Board of Education.

District(s)... Patchogue-Medford

Superintendent... Raymond Fell

Schools Involved... Eagle Elementary School

Location... Medford, New York

The Patchogue-Medford School District is in the middle of a technology revolution. By 1994 every student, teacher and administrator within the district will have access to a fiber optic area wide network allowing them to share video, voice and data. All classrooms in the eleven district schools, school-level administrative offices and central offices will be interconnected electronically.

Eagle Elementary School was the first school to be transformed in this district-wide initiative. Five computers were placed in each of the school's 37 classrooms. In addition, each classroom was wired for video and voice transmission. A lab with 25 computers was established for group instruction. Computers also were placed in all art, music, special education, resource and reading rooms as well as in the library and gym. Even the principal, nurse and custodian received computers for their offices.

Teachers were encouraged to take computers home so they could become familiar with the technology and the instructional software at their own pace. Workshops reinforced their personal learning and helped teachers further explore the technology. Parents also participated in workshops and took part in software evaluation. The Board of Education encouraged communication among teachers, parents and administrators.

The success of Eagle Elementary's pilot project encouraged the Board of Education to expand the program to the 10 other schools in the district. To gain awareness of technology's exciting possibilities, seven hundred teachers, administrators, board members and parent leaders attended a two-day technology conference. Participants could choose from more than 60 workshops dealing with specific software, technology and educational concepts. The conference served as a wonderful kick-off for the district-wide technology drive, generating considerable enthusiasm and creating a team approach to the project.

When completed, the technology project should transform the educational experience. Teachers no longer will be the primary source of information.

Instead, they will help students learn to access, organize and analyze the wealth of information available through the network.

In addition, the technology will make it easier for students to help each other. The ease of communications between students at different schools and grade levels will encourage writing and promote peer mentorships. By bringing advanced computer technology to all of the district schools, Patchogue-Medford will give every student access to state-of-the-art learning systems and offer endless possibilities for distance learning and communications.

TECHNOLOGY AS A LIFE TOOL

Team Members... Barbara Shelly, Teacher - work phone: (315) 475-1621; Marilyn Trainor, Teacher; Dr. Suzanne Gilmour, Principal; Jean DeLacey, Chairperson - Special Education Committee.

District(s)... Westhill Central

Superintendent... William Blydenburgh

Schools Involved... Westhill High School

Location... Syracuse, New York

While the purpose of Westhill High School's technology program was acceptance of technology as a tool for learning across academic disciplines, the program has created an unexpected benefit -- working with computers creates a more collaborative atmosphere.

Westhill teachers realized students worked in pairs, helped each other and remained on tasks longer while in the computer lab. These observations led teachers to explore different cooperative learning strategies.

First, they realized that the physical arrangement of the lab can foster cooperation. Students were able to move their chairs closer together and, thus, were more likely to be involved in different activities as a group. Second, teachers learned that by assigning different tasks to group members they created a sense of teamwork.

Third, results and evaluations are dependent on each group member contributing to the final solution rather than one person arriving at an answer independently. Students were much more involved in the subject matter and had more animated discussions of the problems when each person's contribution was expected and respected. In addition, teachers realized that they were able to reach at risk students who had not had much academic success, and the teachers have seen it as a valuable strategy for addressing different student learning styles.

By encouraging group problem solving, Westhill teachers help students learn two important life skills--working as a team and solving problems in a group, both of which are important in today's business environment.

The cooperative learning process has been so successful in one mathematics classroom that the program has been extended throughout the math department. In addition, the science department has proposed developing a new classroom following this model and incorporating multi-media technology, as well.

Perhaps most important, this cooperative atmosphere is not limited to just Westhill classrooms. Students, teachers and parents are free to use the computer labs during open times. An unusual camaraderie exists in these labs as all users work as equals, freely sharing information and skills.

INVENT AMERICA

Team Members...Bernadette Reichle, Principal - work phone: (914) 744-2031; Edward Duncanson, Teacher; Michele Staves, Teacher; Howard Lynne, IBM Program Manager.

District(s)...Pine Bush Central

Superintendent...William Bassett

Schools Involved...Circleville Elementary

Location...Circleville, New York

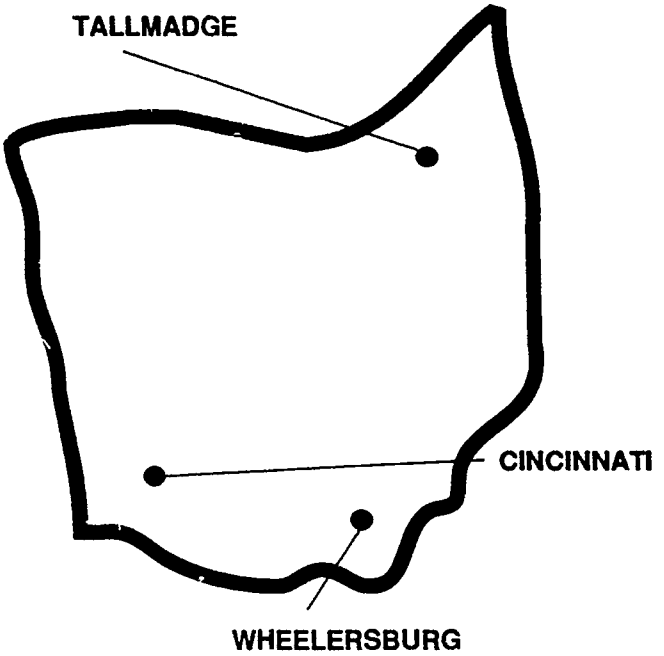
A drainer for bathtub toys, a lunch box divider that protects sandwiches from killer apples, and a microwave touch pad with raised numbers designed for blind people -- these are just a few of the inventions created by Circleville Elementary students as part of the Invent America program.

Students solve real-life problems with their inventions which are displayed and judged at a school-wide Invention Convention. In addition to the general invention category, students may enter their inventions in special category award areas including best invention to help the environment, most humanitarian invention, inventions to help individuals with special needs, best household invention and best leisure time activity invention.

Although parents may help with model building and application filing, the ideas and research must be the students' own work. Students work on their projects during class time, integrating principles learned across the curriculum. In addition, local science-related businesses serve as special resources for the program, providing speakers, giving classroom demonstrations and taking children on plant and office tours. The hands-on nature of the program helps children translate textbook principles into problem-solving solutions.

Next year the students will learn a little about the next step in the invention process -- marketing their products. The Prototypes and Marketing Corp. of Pearl River, New York, has offered to help winners of the district-wide competition register their projects with the U.S. Patent Office.

Ohio



INTERDISCIPLINARY STUDY UNITS

Team Members... Anthony Valerius, Jr., Teacher - work phone: (513) 853-2500; Donald Hatfield, Teacher; Beverly Lewis, Teacher; Edward Stober, Teacher/Dept. Chair.

District(s)... Cincinnati Public Schools

Superintendent...J. Michael Brandt

Schools Involved... Porter Middle School

Location... Cincinnati, Ohio

When teachers from Cincinnati's Porter Middle School attended a workshop on HyperCard software several years ago, they expected to learn about an exciting technology. The workshop exceeded their expectations. Not only did they improve their HyperCard skills, they formed a two-year partnership with teachers from Cincinnati Country Day School, a suburban private school, to promote joint projects between students at both schools.

For one project, students joined for a walking tour of Cincinnati's Historic 4th Street District, an area rich in nearly 200 years of history. Then they paired with a student from the other school to develop HyperCard stacks based on what they had seen and learned on the tour. Another project focused on city government with the students visiting city hall and learning about the city manager form of government.

The students visited back and forth, working on their projects on computers in both schools. In addition, they communicated through an electronic bulletin board maintained at the city's Educational Technology Office.

During one of their joint work sessions, a university professor observed the group working. After 45 minutes, the professor approached one of the teachers to identify the inner city students since they could not be identified by work habits or enthusiasm for the project. Each student's contribution was important--the sign of true collaboration.

The success of these joint projects laid the foundation for increased use of technology in the classroom. Now in its third year at Porter, the HyperCard project is expanding to include most of the middle schools in the city.

Porter Middle School sits in the middle of a housing project; a number of the students have been labeled "learning disabled" and a few have created behavior problems--all Porter students are considered "at risk." None of these issues mattered.

The HyperCard approach to learning completely changed the students' attitudes about school. Previously apathetic children were coming early and staying after school. Students who had never completed a task were proud of their stacks and

volunteered to show visitors their projects. The students had a sense of ownership of their work not seen in more traditional forms of schoolwork. Leaders arose from the ranks and began to teach other students. Technology has turned students on to the joys of learning.

LIGHTHOUSE EDUCATION ENHANCEMENT PROJECT (LEEP)

Team Members... Carole Walker, Project Coordinator - work phone: (216) 633-0612; Linda Jones, Principal; Beth Schultz, Teacher; Jo Ann Uslick, Kent State University.

District(s)... Woodridge Local S.D. and Tallmadge City School

Superintendents... Richard Clapp (Woodridge) and Daniel McCombs (Tallmadge City)

Schools Involved... Woodridge Elementary School and Dunbar Primary School

Location... Cuyahoga Falls, Ohio and Tallmadge, Ohio

Many educators dream of creating school/ business partnerships; the Lighthouse Education Enhancement Project is showing those dreamers how such a partnership actually works. Conceived as a joint effort between two Northeast Ohio school districts and Kent State University to improve mathematics instruction by using computers in the classroom. the project has grown into a unique collaboration of businesses, schools, government and private foundations all working together to improve the quality of education.

The project's goal is to teach math as a skill that can be applied in everyday life. For a number of years, business leaders have noted the declining math skills of the work force. By making math and computer instruction an integral part of every classroom, the project partners hope to reverse that decline. The classroom emphasis on critical thinking, problem solving and the use of computers gives students an early start in developing tools essential for functioning in today's technology-oriented world.

Just as children need to learn in new ways, so must teachers learn new instructional strategies to incorporate today's technology into their classrooms. Teachers involved in the pilot project receive on-going training from Kent State University as well as from several business partners. In addition, student teachers and teachers in other school districts can observe the Lighthouse project classrooms as working models of a new way to teach mathematics.

The project has attracted more than $1.2 million in support from private business and charitable foundations. But the success of this project is measured not only in financial commitment. Business and foundation partners are encouraged to become active members of advisory committees. Chief executive officers of major corporations view their companies' contributions as investments rather than charitable donations.

As more school systems and business partners join the project, the importance of improving our educational system becomes the overriding theme. Educators and business leaders are reaching across traditional boundaries to work for a common goal. The Lighthouse project provides a beacon both for a new approach to education and for a new cooperative attitude toward solving some of society's difficult problems.

COMPUTER ART EDUCATION PROGRAM FOR VISUALLY GIFTED

Team Members... Thomas Suter, Art Instructor - work phone: (614) 574-2527; Anthony Mantell, Principal; Robyn Thomas, Member of Board of Education; Myron Martin, Manager-Dow Chemical.

District(s)... Wheelersburg Local Schools

Superintendent... Frank Miller

Schools Involved... Wheelersburg High School

Location... Wheelersburg, Ohio

Most final exams are private communications between students and their teachers. But art students at Wheelersburg High put their final project on display for drivers traveling U.S. 52. The students created a 9-by 22-foot billboard that combined computer graphics with more traditional designs.

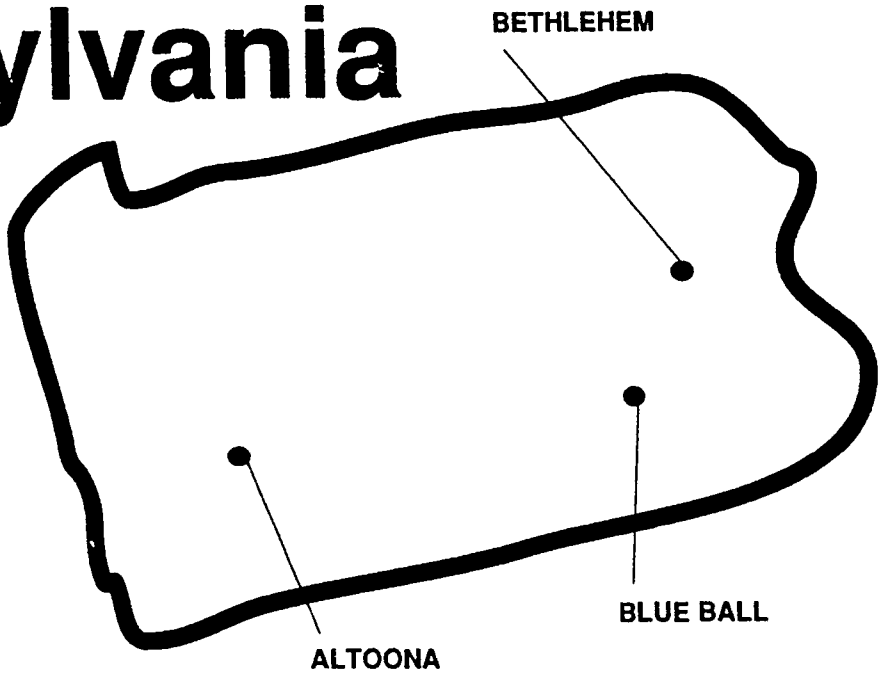
Gifted art students used the billboard as well as a number of smaller projects to explore computer technology and its impact on art and society. Each student created a video portfolio as well as computer generated art and animation for exhibit. In the process, they developed useful skills in desktop publishing and graphic arts.

A special partnership with DOW Chemical USA allowed students to work with sophisticated equipment including color laser printers and professional audio/visual equipment. DOW sponsored a computer workshop attended both by company employees and Wheelersburg students. Student photography and graphic designs also have been used in company newsletters and training materials. In addition, the company sponsored an exhibition of student art work at a state building in Columbus.

Another informal partnership developed with the local newspaper. Students visited the newspaper offices and trained employees to use desktop publishing programs and a graphics network on the Macintosh.

The art program provided talented students with two major benefits: exposure to technologies that enhance their creative abilities and experience on projects with practical applications. In a rural area plagued by high unemployment, any program that helps students compete in the job market is invaluable. Wheelersburg students will be able to show prospective employers portfolios of specific projects produced using sophisticated technologies. This type of "job experience" should help Wheelersburg students compete with students from other regions of the state and the nation.

Pennsylvania



VOYAGE OF THE MIMI

Team Members... Linda Hitchcock, Principal - work phone: (717) 354-1525; Jane Miron, Teacher; Judith Mollohan, Teacher; Fern Entrekin, Media Specialist.

District(s)... Eastern Lancaster County

Superintendent... William Rohrer

Schools Involved... Blue Ball Elementary

Location... Blue Ball, Pennsylvania

For 26 weeks fourth grade students at Blue Ball Elementary joined a research expedition studying whales off the coast of New England. Setting sail on the 72-foot ketch Mimi, *the students navigated the seas in search of humpback whales and even found themselves stranded on an island after a devastating storm. Quite an adventure for 9 year-olds, even if they didn't leave the classroom.*

Using a multi-media science program, "Voyage of the Mimi," *as the basis for the curriculum, the fourth grade teachers expanded the program so students spent the entire day focusing on the expedition. Language arts, music, social studies and physical education projects all contributed to the experience.*

The 13 video episodes of the real Mimi's *crew set the stage for a variety of activities. Computer simulations taught basic concepts of map reading and navigation. Students kept journals of their adventures and read realistic fiction. They learned songs of the sea and composed an original rap song about the adventure. Art projects had sailboat or fish themes. And students explored resources in the school's media center while researching a final project.*

Subject matter flowed naturally from the demands of the voyage. Because one of the crew members was deaf, students needed to learn sign language. Local police helped fingerprint the children and discussed individual human markings during a lesson on fluke identification. For six months, students worked toward making the expedition a success. When they finally visited the real Mimi *berthed in Philadelphia, the ship seemed like home and the captain like an old friend.*

CROSSROADS OF THE WORLD

Team Members... Dawn Morden, Teacher - work phone: (814) 946-8511; Dr. Francis Meloy, Assistant Superintendent; Ronald Kuhn, Board Member; Constance Letscher, Teacher.

District(s)... Altoona Area School District

Superintendent... Dr. Dennis Murray

Schools Involved... Pleasant Valley Elementary School and Penn-Lincoln Elementary School

Location... Altoona, Pennsylvania

One of the joys of traveling is looking through a scrapbook filled with photos and mementos. Sixth graders at Pleasant Valley Elementary have nearly a year of memories in their Canada scrapbooks. Without leaving their classroom, the students planned and then took an imaginary trip across Canada. Computers rather than cars transported the students across thousands of miles, giving them a glimpse of how their northern neighbors work and play.

Any trip requires detailed planning. Students learned basic map reading and budgeting skills using a variety of computer simulations. They visited a travel agency to gather basic information about potential destinations. Follow-up letters were sent to local Chambers of Commerce. World Classroom, a telecommunications network, gave the students a link to classrooms in Canada.

The students made a video about Altoona and Blair County to send to their Canadian pen pals. Produced in a news format, the video highlighted important sights for their Canadian friends to see if they took an imaginary trip to Pennsylvania.

Each student team planned an itinerary from Pennsylvania to Halifax, Nova Scotia, the group's first major stop. Before leaving on their trip, the class invited their families and friends to a Bon Voyage party. At the party, they presented their full itinerary and talked about what they hoped to do on the trip.

As they traveled across Canada, visiting at least one city in every province, the students created travelogues using historical, cultural and geographic information gathered from on-line networks, letter writing, newspapers, videos and books.

When the trip was over, they gathered their memories into two scrapbooks, one a traditional hardcover book with pictures, parts of their written travelogues and other mementos. The second scrapbook, using HyperCard technology, allowed the students to combine text, sound and pictures on one computer disk. The children also shared their Canadian experiences via modem with 5th grade students in other local elementary schools.

As more teachers learn about Crossroads to the World, students in other Altoona schools will be able to fill their scrapbooks and reminisce about their trips with their families as well as with new friends made throughout Canada.

PRINCIPLES OF APPLIED ENGINEERING

Team Members... Thomas Remely, Instructor - work phone: (215) 866-8013; Ernest Ibarra, Guidance Service Coordinator; George Kane, Sr. Engineer - Bethlehem Steel.

District(s)... Bethlehem Area Vocational-Technical

Superintendent... Donald Foellner

Schools Involved... Bethlehem Area Vocational-Technical School

Location... Bethlehem, Pennsylvania

Too often vocational education classrooms are filled with sophisticated equipment but no students. The students who could use the equipment to understand scientific and mathematical principles usually are at another school, working in classrooms equipped with nothing more than blackboards and chalk. The Bethlehem Area Vocational-Technical School (BAVTS) has solved this problem by attracting honors students to a course specifically designed to use the hands-on resources of vocational education.

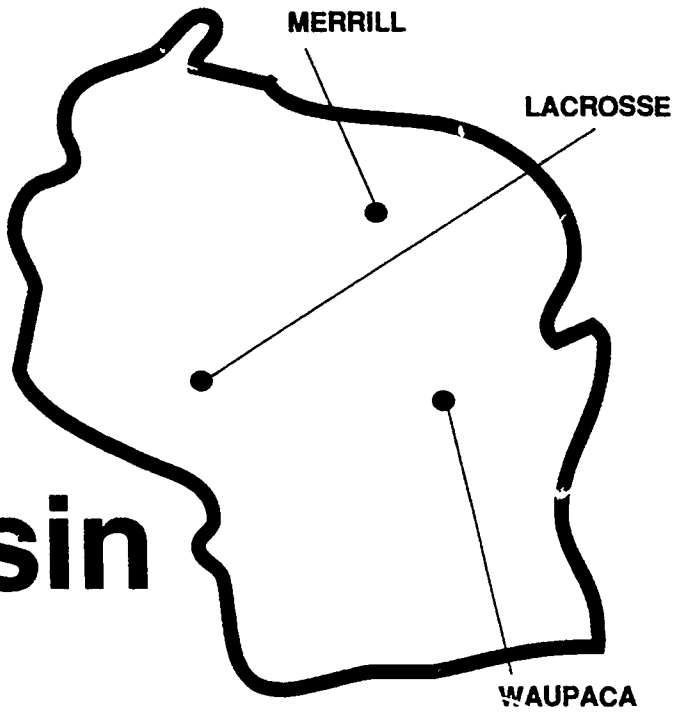
Honors level physics students can enroll in the Principles of Applied Engineering program at BAVTS. The course stresses hands-on experiences, individual as well as team projects, seminars with guest speakers and visits to area universities, laboratories and businesses. This marriage of scientific theory with the reality of engineering gives students an unusual opportunity to integrate academic science with real-world problem solving.

Students learn how engineering projects are managed by working in teams that contribute to a larger class project. One or two week classes in computer aided design and machine technology expose students to other areas of vocational training. The class is taught by a team of instructors with experience in engineering, technology and education. The honors physics instructors also contribute to curriculum planning as well as teach certain units.

Another important aspect of this program is the opportunity for students to work closely with engineers and managers at the engineering centers of local businesses. Students gain invaluable hands-on experience and insight into the day-to-day operations of major American corporations. Such experiences help students refine career goals as well as give them confidence to pursue project-related tasks in future jobs.

Evaluation of student performance during the course is based primarily on achieving certain levels of competency, a long-established principle in vocational education. At the beginning of the program, each student agrees to work on an individualized list of competencies outlined for the year. Parents are encouraged to participate in developing these lists.

This program has shown the value of application-based instruction for all secondary students. In the future, increased cooperation between academic and vocational-technical educators will provide students with greater opportunities to experience the best of both educational worlds.



Wisconsin

BRIDGES

Team Members... Linda Klein, Teacher - work phone: (715) 258-4135; Marie Howard, Teacher; Bruce Gunderson, Principal; Mark Polebitski, Teacher.

District(s)... Waupaca

Superintendent... Dr. David Poeschl

Schools Involved... Waupaca High School

Location... Waupaca, Wisconsin

When Marshall McLuhan first envisioned a "global village" brought closer by electronic media, television was a passive technology allowing viewers a glimpse of their neighbors' lives and cultures. Today students at Waupaca High School use technology to interact with their neighbors around the world, not just receive information. Such active involvement gives students a much deeper understanding of other cultures and a more personal investment in the communication process.

The first Waupaca project to bridge cultures was "Hands Across the Sea," an exchange with a partner school in Germany. Students at the two schools communicate with E-Mail, FAX machines, camcorders and multi-format VCRs. They have exchanged letters, school newspapers, yearbooks, slides, textbooks and cultural information -- all of which break down language barriers and increase communication. The team hopes to expand this project to a three-way exchange of language skills, cultural information and technology by linking a Nicaraguan school into the existing format.

Waupaca students will use similar technologies to cross barriers between themselves and other cultures closer to home. A cooperative writing project on legends, cultural heroes and origin stories should open communication links between students at the high school and Menominee Indian Schools. Telecommunications technology will allow summer school students at Waupaca High School to exchange story telling, writing, art, dance and video with Asian students attending an intensive English for college program at the University of Wisconsin Stevens Point. The team also hopes to initiate an exchange writing project with residents of a veterans' home.

Not only are these projects helping students to learn about other cultures, races and socio-economic groups, they are learning how to use the technology. Technology has become the bridge that links a diversity of groups into a truly interactive global village.

MODEL SCHOOLS PROGRAM

Team Members... John Gravelle, Teacher - work phone: (715) 536-4594; Dennis Knott, Construction-Detailer; Dr. Ralph Neale, Superintendent.

District(s)... Merrill Area Public Schools

Superintendent... Dr. Ralphe Neale

Schools Involved... Merrill Sr. High School

Location... Merrill, Wisconsin

Scientists use high powered computers to predict the hole in the ozone layer or determine climatic conditions resulting from the Mt. Saint Helens earthquake. Through a network linked to a Cray Super Computer, students at Merrill Senior High School, as well as students at about 100 other school districts, can work on the same type of $10 million computer government researchers and university scientists use to make their ozone layer and climatic change predictions.

The super computer, located at the Lawrence Livermore Laboratory in California, performs millions of mathematical operations in a second. Capable of performing in seconds or minutes tasks that might take hours on a PC if the necessary software was available, the super computer allows students to work on a variety of complex problems.

For example, students can see the effect an automobile's design has on the concept of wind drag. In the past, scale models of automobiles had to be built and tested in a wind tunnel to determine a particular design's effect. Now Merrill students can mathematically change the slope of a car's hood and the super computer will calculate the drag. Or they can use the climatic change software to see what would happen if a 50-ton iceberg suddenly appeared in the San Diego harbor.

Using the same type of computer programs that create special effects for movies, Merrill students can design 3-dimensional pictures of mathematical formulas. As the variables in the formulas are changed, the graphic picture of the formula also changes. The visual representation of the wave pattern or object created by the formula gives students a powerful learning tool. The formula becomes a concrete object and not just a series of numbers.

In addition, the computer can rotate the object, take an electronic snapshot at each stage of manipulation, and then put those snapshots into motion to give students another tool for understanding a complex mathematical concept.

Access to the super computer has reshaped the content of an academic course at Merrill High School and the ways teachers impart the material. The Merrill team hopes to extend the benefits of that access as well as expand other opportunities for sharing between Wisconsin public schools. By developing a network that would link other schools to the Cray super computer as well as to each other, the team would help other teachers appreciate the impact that technology can have on their students.

SOUNDSCAPE

Team Members... Gerald Kember, Supervisor of Fine Arts - work phone: (608) 789-7662; Robert Swerman, Jr., Teacher.

District(s)... LaCrosse

Superintendent... Richard Swantz

Schools Involved... Logan High School

Location... LaCrosse, Wisconsin

For ten years the music appreciation course at Logan High School languished. Student nixed the course at registration time. But disinterest quickly changed to enthusiasm when the course was redesigned to reflect a teen approach to music. Synthesizers, compact discs and computers became an integral part of the newly dubbed "Soundscape" course and forty students quickly signed on.

Classes meet in the school's Macintosh computer lab using work stations equipped with computers, synthesizers, and CD-ROMs all tied to a laser printer. Students learn to appreciate music by creating it. They write new songs as well as manipulate the works of others. Their compositions can be printed out, copied and distributed to the teacher and other students. Works are saved on disc for playback on the synthesizer.

By using technology that excites teenagers, Soundscape draws a broad mix of students, many who never participated in a music class before. Students who want to be better listeners but have no interest in performing now have an opportunity to learn more about music.

Logan High's success has spurred another high school in the district to adapt its computer lab to accommodate Soundscape classes. When one student received a free computer from Apple Computer, Inc., based on the quality of music he created in the class, music appreciation gained new respect in the school. This is now one course that won't be put on the shelf.